



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,917	09/17/2003	Takeshi Akatsu	4717-8900	2653
28765	7590	05/20/2005	EXAMINER	
WINSTON & STRAWN LLP 1700 K STREET, N.W. WASHINGTON, DC 20006			PERKINS, PAMELA E	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,917

Applicant(s)

AKATSU ET AL.

Examiner

Pamela E. Perkins

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-14, 19, 26 and 27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-14, 19, 26 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/17/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the filing of the amendment on 17 February 2005. Claims 1-3, 6-14, 19, 26 and 27 are pending; claims 4, 5, 15-18 and 20-25 have been cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-13, 19, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maa et al. (6,780,796) in view of Kub et al. (6,323,108).

Maa et al. disclose a method of preparing crystalline wafer where a first composite structure comprises a support substrate (10) and a first epitaxial layer (12) that is in a strained state and is associated with one side of the support substrate (10) (col. 3, lines 43-59); and relaxing the strained state of the first epitaxial layer (12) of the composite structure to an at least partially relaxed state by providing dislocations in a dislocation layer within the first composite structure in a configuration sufficient to relax the first epitaxial layer (12) to a substantially relaxed state (col. 3, line 60 thru col. 4, lines 19). Maa et al. further disclose forming a strained silicon (22) over the epitaxial layer and the support substrate (10) as a semiconductor wafer (col. 4, lines 24-26).

Referring to claim 12, Maa et al. disclose the support substrate (10) comprising silicon (col. 3, lines 43-52).

Referring to claim 13, Maa et al. disclose the first epitaxial layer (12) comprising silicon germanium (col. 3, lines 52-59).

Referring to claim 19, Maa et al. disclose where energy is added to the first composite structure to relax the first epitaxial layer (12) (col. 4, lines 9-19).

Referring to claim 27, Maa et al. disclose growing the first epitaxial (12) in the strained state (col. 3, lines 43-59).

Maa et al. do not disclose associating a receiving substrate with the first composite structure with the side of the support that includes the first epitaxial layer; and obtaining a production wafer and a donor wafer by splitting the first composite structure at a region of weakness located therein.

Kub et al. disclose a method of preparing crystalline wafer where a first composite structure comprises a support substrate (10) and a first epitaxial layer (14) associated with one side of the support substrate (10) (Fig. 1A; col. 5, lines 14-37); associating a receiving substrate (18) with the first composite structure with the side of the support that includes the first epitaxial layer (14); and obtaining a production wafer (18) and a donor wafer (10) by splitting the first composite structure at a region of weakness located therein (Fig. 1C; col. 6, lines 23-42; col. 7, line 50 thru col. 8, line 3).

Kub et al. further disclose creating the region of weakness by implanting atomic species at an implantation location (col. 5, lines 57-61).

Art Unit: 2822

Referring to claim 6, Kub et al. disclose providing an additional layer (16) on the first epitaxial layer (14) prior to associating the receiving substrate (18) with the first composite structure, wherein the receiving substrate (18) is bonded to the additional layer (16) (Fig. 1B; col. 6, lines 22-25).

Referring to claim 9, Kub et al. disclose removing a layer (10a) of the production wafer (18) disposed on an opposite side of the first epitaxial layer (14) from the receiving substrate (18) to provide an exposed surface (Fig. 1D; col. 6, lines 47-50).

Referring to claim 10, Kub et al. disclose providing another layer on the exposed surface of the production wafer (Fig. 1E; col. 6, lines 51-56).

Referring to claim 11, Kub et al. disclose the another layer is grown on the exposed surface (col. 7, lines 26-49).

Since Maa et al. and Kub et al. are both from the same field of endeavor, a method of preparing crystalline wafer, the purpose disclosed by Kub et al. would have been recognized in the pertinent art of Maa et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Maa et al. by associating a receiving substrate with the first composite structure with the side of the support that includes the first epitaxial layer; and obtaining a production wafer and a donor wafer by splitting the first composite structure at a region of weakness located therein as taught by Kub et al. to avoid lattice mismatch (col. 3, lines 6-32).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maa et al. in view of Kub et al as applied to claim 1 above, and further in view of Yoshida (6,787,793).

Maa et al. in view of Kub et al. disclose the subject matter claimed above except relaxing the first epitaxial layer sufficiently to reduce the strain thereof to less than 75% of the strain than in the strained state.

Yoshida discloses a method of preparing crystalline wafer where a first composite structure comprises a support substrate (1) and a first epitaxial layer (2) that is in a strained state and is associated with one side of the support substrate (1); relaxing the strained state of the first epitaxial layer (2) of the composite structure to an at least partially relaxed state (col. 6, lines 56-66). Yoshida further discloses relaxing the first epitaxial layer (2) sufficiently to reduce the strain thereof to less than 75% of the strain than in the strained state (Fig. 3; col. 5, lines 18-29).

Since Maa et al. and Yoshida are both from the same field of endeavor, a method of preparing crystalline wafer, the purpose disclosed by Yoshida would have been recognized in the pertinent art of Maa et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Maa et al. by relaxing the first epitaxial layer sufficiently to reduce the strain thereof to less than 75% of the strain than in the strained state as taught by Yoshida to increase mobility and improve smoothness (col. 1, lines 25-48; col. 2, lines 58-67).

Response to Arguments

Applicant's arguments with respect to claims 1-, 6-14, 19, 26 and 27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E. Perkins whose telephone number is (571) 272-1840. The examiner can normally be reached on Monday thru Friday, 9:00am to 5:30pm.

Art Unit: 2822

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PEP


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800